

CLAIMS

1. An objective lens system, particularly for a fingerprint reader apparatus, said lens system comprising a first lens formed as a condensing lens guiding light beams arriving from an object generally telecentrically, an aperture stop having a centre and being located in the vicinity of a focal point of the first lens, a correcting second lens arranged between the first lens and the aperture stop and juxtaposed with the aperture stop, and a correcting third lens formed as a condensing lens and arranged beside the aperture stop opposite the second lens, characterised in that the second lens (10) is a condensing lens with a spherical surface (S_3) facing the first lens (8), wherein the curvature centre of the surface (S_3) is at a distance shorter than 15 % of the curvature radius of the surface (S_3) from the centre (P) of the aperture stop (9), and the aperture stop (9) is arranged at a distance shorter than 25 % of the focal length of the first lens (8) from the focal point of the first lens (8).

2. The objective lens system according to claim 1, characterised in that focal lengths f_1 , f_2 and f_3 of the first, second and third lenses (8, 10, 11) satisfy the relation $f_1 > f_3 > f_2$.

3. The objective lens system according to claim 1 or claim 2, characterised in that the aperture stop (9), the second lens (10) and the third lens (11) are formed as a separate unit (3) not dependent on the size of the object, and the first lens (8) is formed as a matching lens having a focal length depending on the size of the object.

4. The objective lens system according to any of claims 1 to 3, characterised in that the first lens (8) is a plano-concave lens, the third lens (11) is a convex-planar lens and the second lens (10) is of a meniscus shape bending towards the aperture stop (9).

5. The objective lens system according to any of claims 1 to 4, characterised in that the first lens (8), the second lens (10) and the third lens (11) are formed with spherical surfaces (S_1 , S_2 ; S_3 , S_4 ; S_5 , S_6).

6. The objective lens system according to any of claims 1 to 4, characterised in that the first lens (8), the second lens (10) and the third lens (11) have at least one aspherical surface.

7. The objective lens system according to claim 5 or claim 6, characterised in that the first lens (8), the second lens (10) and the third lens (11) are made of glass.

8. The objective lens system according to claim 5 or claim 6, characterised in that at least one of the first, second and third lenses (8, 10, 11) is made of plastic.

9. The objective lens system according to claim 5 or claim 6, characterised in that at least one of the first, second and third lenses (8, 10, 11) consists of two lens parts cemented to each other, said two lens parts being made of materials having different dispersion.

10. The objective lens system according to claim 1, characterised by further comprising a mirror or a first prism diverting the light beams and being arranged in an air space (e_2) between the first lens (8) and the second lens (10).

11. The objective lens system according to claim 1, characterised in that the object is a print of a finger on a print area (7) of a total-reflecting surface of a second prism (6).

12. The objective lens system according to claim 11, characterised in that the first lens (8) is a plano-concave lens and is cemented to a light exit surface of the second prism (6).

13. The objective lens system according to claim 11, characterised by projecting the print on the print area (7) onto an image sensor (4).

14. The objective lens system according to claim 13, characterised in that said image sensor (4) is a CMOS image sensor.

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